

[0094] We claim:

1. A system for transporting and selectively sorting particles comprising:  
a first wall and a traveling wave grid extending along said first wall;  
a second wall having a passage extending therethrough;  
a gate operatively associated with said passage; and,  
a controller adapted to output a multi-phase electrical signal and in electrical communication with said traveling wave grid and said gate.
2. The invention of claim 1, wherein said passage is comprised of a plurality of apertures extending through said second wall.
3. The invention of claim 2, wherein said plurality of apertures are substantially cylindrical and have a diameter of from about 10  $\mu\text{m}$  to about 250  $\mu\text{m}$ .
4. The invention of claim 1, wherein said controller outputs an electrical signal having first and second phases to said gate.
5. The invention of claim 1, wherein said passage has a first end and a second end, and said gate includes a first electrode disposed along said passage between said first and said second ends and a second electrode disposed along said passage between said first and second ends and in spaced relation to said first electrode.
6. The invention of claim 5, wherein said controller outputs an electrical signal having first and second phases to said gate, said first phase of said electrical signal

being applied to said first electrode and said second phase of said electrical signal being applied to said second electrode.

7. The invention of claim 1, wherein said passage has a first end and a second end, and said gate includes a first electrode disposed adjacent said first end and a second electrode disposed adjacent said second end.

8. The invention of claim 7, wherein said controller outputs an electrical signal having first and second phases to said gate, said first phase of said electrical signal being applied to said first electrode and said second phase of said electrical signal being applied to said second electrode.

9. The invention of claim 1, wherein said traveling wave grid is a first traveling wave grid and said system further comprises a second traveling wave grid extending along said second wall.

10. The invention of claim 1, wherein said first wall is substantially cylindrical.

11. A system for transporting and selectively sorting particles comprising:  
a housing having a first wall at least partially defining a first transport channel,  
a second wall at least partially defining a second transport channel, and a gating

passage extending in fluid communication between said first and said second transport channels;

a traveling wave grid disposed along said first wall;

a gate operatively associated with said gating passage; and,

a voltage source adapted to output a multi-phase voltage signal and in electrical communication with said traveling wave grid and said gate.

12. The invention of claim 11, wherein said traveling wave grid is a first traveling wave grid, and said system further comprises a continuous particle supply apparatus in fluid communication with said first transport channel, said supply apparatus including a supply housing at least partially defining a supply chamber, and a second traveling wave grid disposed within said supply chamber.

13. The invention of claim 12, wherein said supply apparatus further includes a support wall supported within said supply chamber and said second traveling wave grid extends along at least a portion of said support wall.

14. The invention of claim 13, wherein said support wall is generally cylindrical.

15. The invention of claim 12, wherein said gating passage is a first gating passage, and said supply apparatus is in fluid communication with said first transport channel through a second gating passage extending between said supply chamber and said first transport channel.

16. The invention of claim 15, wherein said gate is a first gate, and said system further includes a second gate in electrical communication with said voltage source and operatively associated with said second gating passage.

17. The invention of claim 11, wherein said gate includes first and second electrodes disposed along said gating passage.

18. The invention of claim 17, wherein said voltage source outputs a voltage signal having first and second phases, said first phase being applied to said first electrode and said second phase being applied to said second electrode.

19. The invention of claim 11, wherein said traveling wave grid includes four conductor groups, each having a plurality of conductors, said conductor groups disposed in an inter-digitized pattern.

20. The invention of claim 19, wherein said voltage source outputs a four phase voltage signal, and each of said four phases is applied to a different one of said conductor groups.

21. The invention of claim 11, wherein said traveling wave grid is a first traveling wave grid and said gating passage is a first gating passage, said housing further includes a third wall at least partially defining a third transport channel and a second gating passage extending in fluid communication between said second and said third transport channels, and said system further includes a second traveling wave grid extending along said second wall.

22. The invention of claim 21, wherein said gate is a first gate, and said system further includes a second gate operatively associated with said second gating passage.

23. A method of transporting and selectively sorting particles, said method comprising the steps of:

providing a first wall at least partially forming a first chamber, a second wall at least partially forming a second chamber, a passage wall at least partially defining a passage extending in fluid communication between said first and second chambers, a traveling wave grid disposed along said first wall, a gate operatively associated with said passage, and a controller adapted to selectively output a multi-phase electrical signal and in electrical communication with said traveling wave grid and said gate;

introducing a quantity of separable particles into said first chamber;

applying a multi-phase electrical signal from said controller across at least a portion of said traveling wave grid inducing flow of said quantity of separable particles along said first chamber; and,

selectively gating a portion of said quantity of separable particles flowing along said first chamber into said second chamber.

24. The method of claim 23, wherein said gate includes first and second spaced apart electrodes disposed along said passage, said step of selectively gating a portion of said quantity of separable particles includes said controller outputting an electrical signal having first and second phases, and applying said first phase to said first electrode of said gate and applying said second phase to said second electrode of said gate.

25. The method of claim 23, wherein said step of providing includes providing a continuous particle supply apparatus in fluid communication with said first chamber, and said step of introducing a quantity of separable particles includes introducing a continuous quantity of separable particles from said supply apparatus.